

CHAPTER 1

INTRODUCTION

1.1 Introduction

Quality product and capable to cope with customers demands are important aspects that should be take an account especially for small and medium industry. Management systems are also contributes in order to planning, controlling and measuring parameters related to the performance of the sectors. Companies should realize that the performance is depending on how well the production line in term of output.

Process layout, product layout and fixed-position layout are 3 basics types of layout [M.Davis.M, Heineke J, 2005].This project are interested on product layout. Product layout is defined as flow-shop layout where number of machine and work processes are arranged so that the products will pass through several workstation. Due to high demand the resources was rearranged from process layout to product layout. This required a sequence steps to make product. Industries often called as a assembly lines.

Assembly lines are general described as progressive assembly linked by some type of material handling. This can be found especially for industries that assembles

product such as electronics part, food and etc. An example of product layout is cafeteria, where customer trays are moving through series of workstations. However bottlenecks are often occurred in assembly line. This will cause delay in term of time and decreasing in line efficiency.

The aims of the study are improving the productivity and compute efficiency of an assembly line in small and medium industry. The objective are redesign the layout for purposing to improve line performance. Computer aided simulation are implemented in this project in order to analyze and investigate the problems occurring in assembly line.

The model will select and using time study techniques it will be analyzed. The line balancing method is use to solve the problem. Comparison of the current layout and new layout are done. Simulation is done by WITNESS software to accomplish this study.

1.2 Project Background

“Manual assembly lines technology has made a significant contribution to the development of American industry in twentieth century” [Groover, 2001]. This phrase emphasizes the importance of assembly line especially in several sectors such as automobiles, consumer appliances and those sectors that produced large quantities product. This indicates the success factors are depending on the efficiency of assembly line. Along assembly lines various operations can be done either manually, automatically or integrated. For manual operations, the workers will perform jobs like brazing, assemblers, welding and so on. Normally for manual process the station will equipped with aided stationary depends on type of tasks. Automation operations are done for high volume quantities with addition features on the workstation. However, assembly line suffered one major problem, bottleneck. This phenomenon is defined as stage where causes the entire process to slow down or stop [Taj,2006]. This can be due to improper scheduling, improper line balancing and machine breakdown or equipment repairing.

Improper line balancing for example is defined on distribution of workloads and workers are not equal along the assembly line. The workers are not assigning equally in each workstation. Machine breakdown sometimes contribute to bottlenecks problem since the products are moving and suddenly had to stop and it start accumulate at certain workstation. Due to this problem, there will one station that has maximum time to perform a task. This station is called bottle neck station [Groover, 2001]. Analysis will be performing to identify the location of bottlenecks. Furthermore the product will start to accumulate hence slow down the process yet reduce the line efficiency

The production rate is depending on how well the line is running. In order to fixed or overcoming bottle necks problems, manual calculation has a limitation. Fact that to analyze every stations are impossible due to time consumption. Simulation is often used to determine the root of bottlenecks. The results are valid for engineers to predict the causes and effectiveness of current layout. New layout is proposed to overcoming this problem. Simulation is tools for conducting experiments without damaging and interfering the real systems.

1.3 Project Motivation

Bottle necking and excessive workers are common problems rose in assembly line. These are the major problems that encounter and yet need to be overcome as soon as possible. Assemblers are often encounters this problems and if this happen it will be decreased the line efficiency and the targeted run rate. In preventing these problems, engineers should come out with a solution in order to fix these problems. One way to do so is using line balancing method. This aim is to minimizing work loads and workers on the assembly line while meeting a required output.

“Small and medium industries are covered 90 percent of enterprises in the world”. [Taj,2006]. Due to competitiveness, meeting a required demand and provide